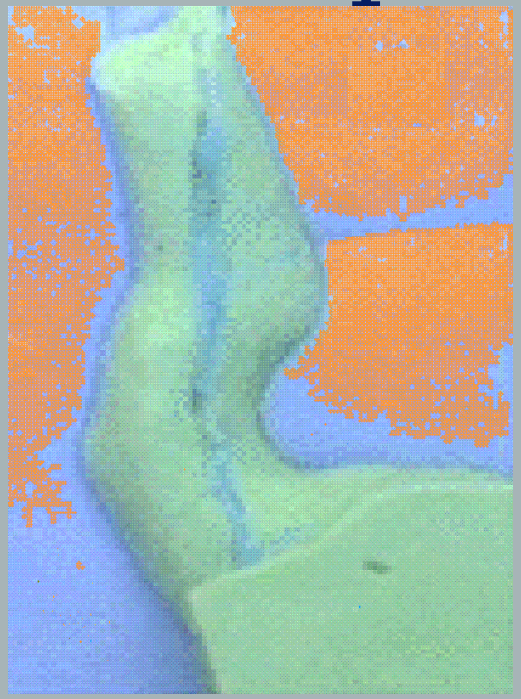
Earmold Impression Techniques



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Outline

I. *Custom hearing protection devices in the aviation community have arrived*

II. *Earmold impression techniques*

III. *Earmold impression materials*

IV. *Earmold impression depth*

V. *Future concerns*

VI. *Conclusion*

I. Custom HPDs in the aviation community have arrived

Why?

1. *Consistent attenuation*
2. *Increased comfort*
3. *Reusable*
4. *Ownership encourages compliance*

Who?

1. *Aircraft Maintainers*
2. *Ground and air crew*

II. Earmold impression techniques

1. *Moving-jaw (chewing)*
2. *Closed-jaw*
3. *Open-jaw with bite block*

Moving-jaw (chewing) technique

Pros:

- *?*

Cons:

- *Takes up least amount of volume when cured*
- *Little retention*
- *Prevents seal between 1st and 2nd bend of EAC*
- *Irritation of skin due to movement of earmold*
- *Patient eats all your office snacks!*

Closed-jaw technique

Pros:

- *Seal may not break while moving jaw*

Cons:

- *Volume of impression material is not optimized*

- *Seal may break while moving jaw*

Open-jaw with bite block technique

Pros:

- *Provides the largest volume of the EAC*

- *Bite block prevents movement of jaw while material cures.*

Cons:

- *Not recommended with Temporo-mandibular Joint Disease/Disorder*

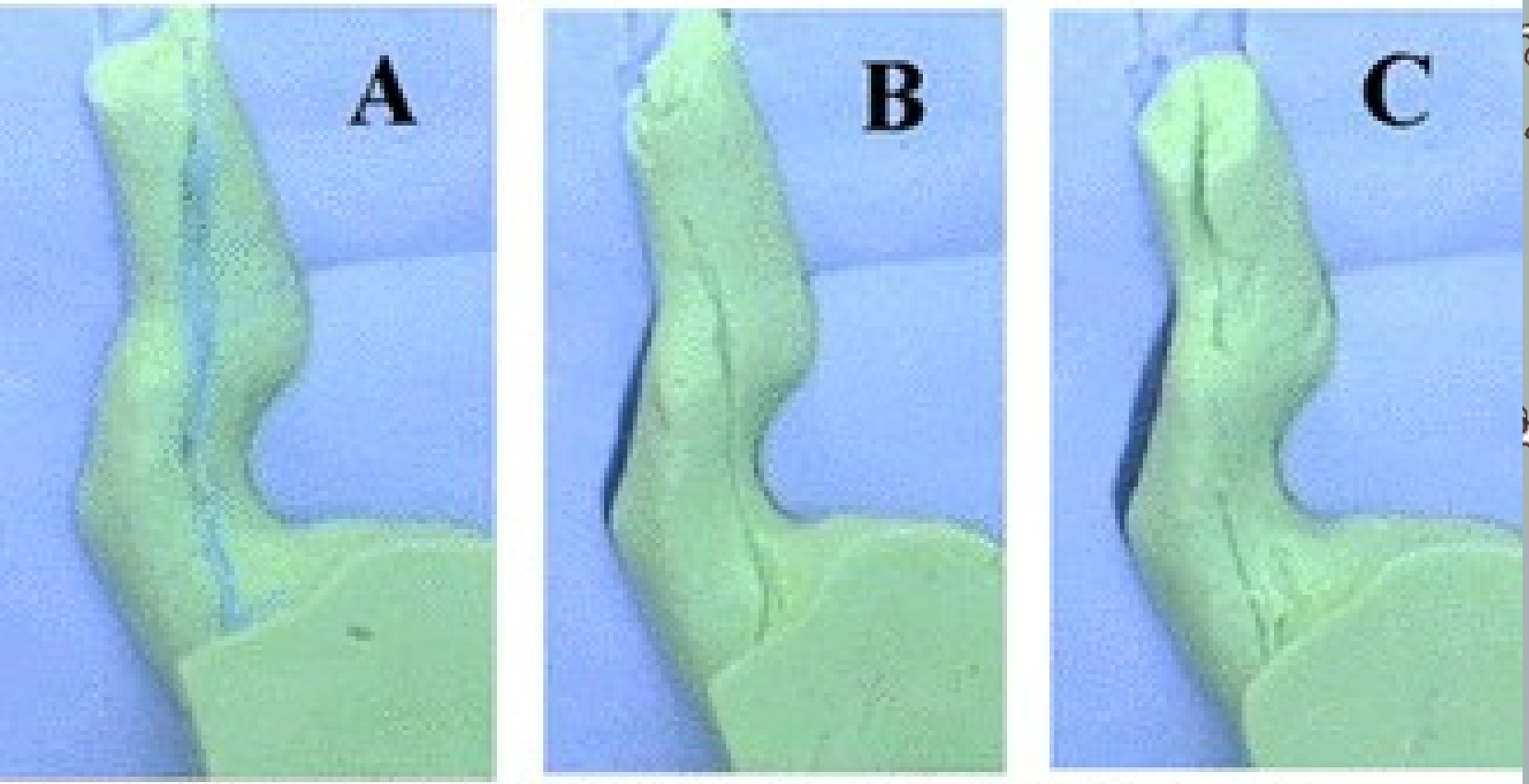


Figure 2. Impression taking technique affects ear impression accuracy. Impressions shown are; open jaw (A), closed jaw (B) and chewing (C). All impressions are photographed in a bisected control ear investment cast from the open-jaw impression.

III. Earmold impression materials

Knowing the viscosity of your earmold impression materials is important because viscosity determines ear canal stretch.

Lower = little stretch

Medium = some stretch

Higher = most stretch

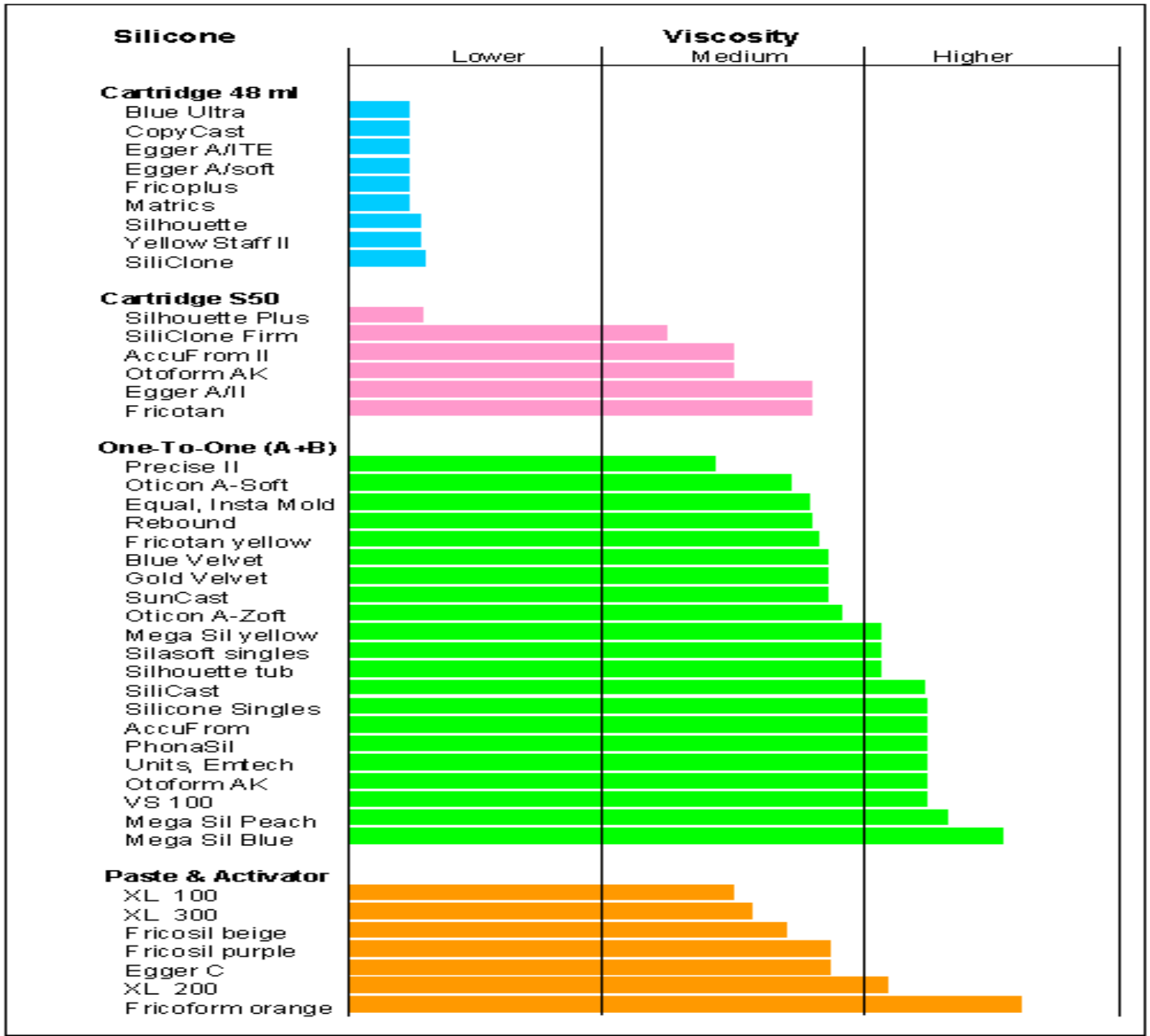
Definitions

Viscosity:

Measurement of the material consistency before curing takes place (polymerizatio n)

Shore-value

Hardness of silicone after curing is complete


Silicone
Viscosity
Lower
Medium
Higher
Cartridge 48 ml
Blue Ultra
CopyCast
Egger A/ITE
Egger A/soft
Fricoplus
Matrics
Silhouette
Yellow Staff II
SiliClone
Cartridge S50
Silhouette Plus
SiliClone Firm
AccuFrom II
Otoform AK
Egger A/II
Fricotan
One-To-One (A+B)
Precise II
Oticon A-Soft
Equal, Insta Mold
Rebound
Fricotan yellow
Blue Velvet
Gold Velvet
SunCast
Oticon A-Zoft
Mega Sil yellow
Silasoft singles
Silhouette tub
SiliCast
Silicone Singles
AccuFrom
PhonaSil
Units, Emtech
Otoform AK
VS 100
Mega Sil Peach
Mega Sil Blue
Paste & Activator
XL 100
XL 300
Fricosil beige
Fricosil purple
Egger C
XL 200
Fricoform orange

Rule of Thumb

One-to-one hand-mixed silicones are either medium or higher viscosity, so are the tub-and-accelerator type silicones.

Examples

Lower Viscosity materials: "Siliclone"

Higher Viscosity materials:"Silicast"

Higher viscosity impression materials are manually mixed and are delivered by an impression syringe as opposed to a gun.

Excuses for not giving up softer viscosity

- *Softer viscosity must equate to more comfort.*
- *Less Mess. No hand contact with the greasy mixtures and no clean up required.*
- *Faster cure time (2-3 minutes) with soft viscosity.*
- *Impression guns deliver a controlled amount of material at a constant rate.*
- *Impression guns “state of the art”.*
- *We don’t get to shoot real gun at work but this is the next best thing.*

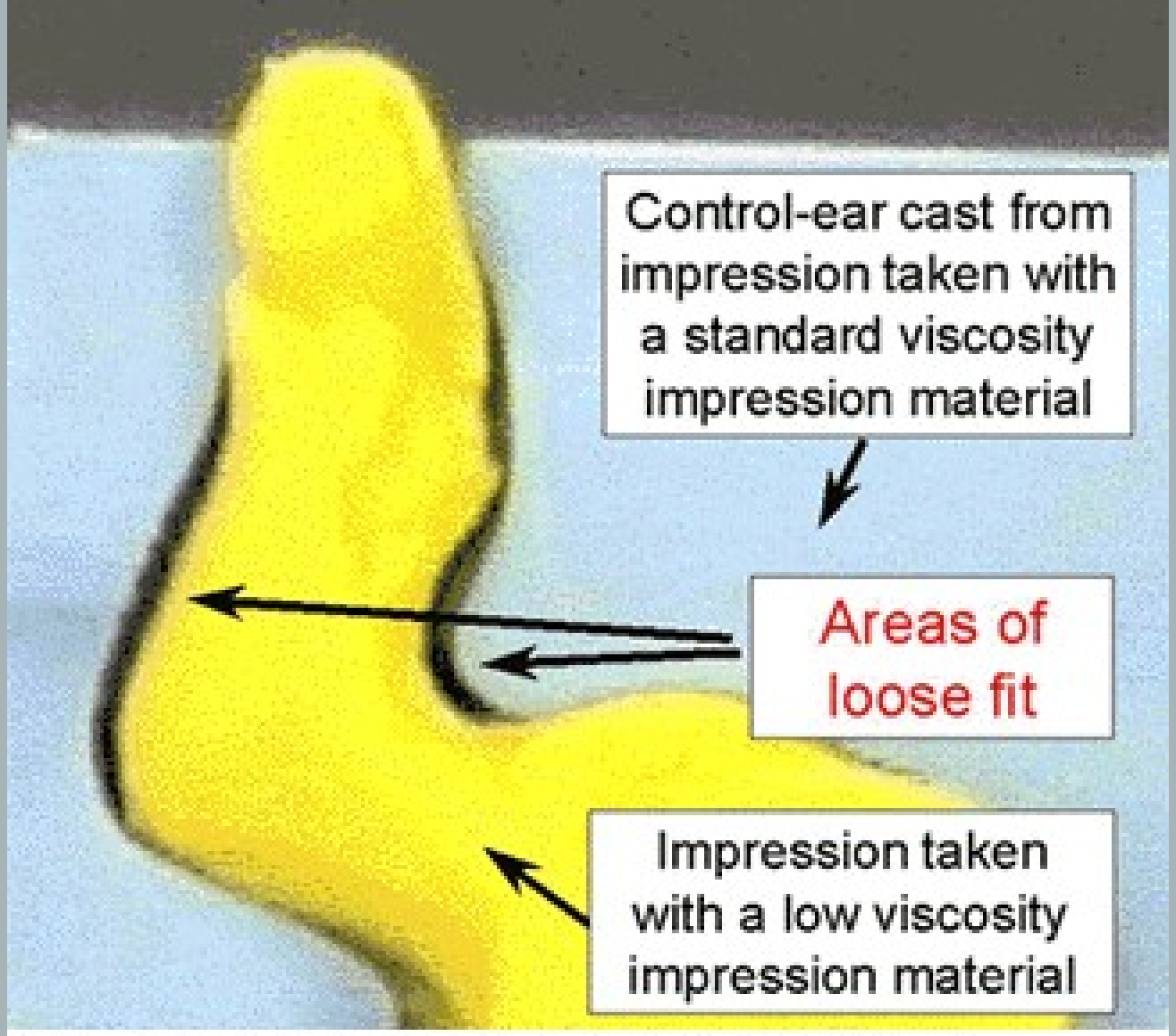

Control-ear cast from impression taken with a standard viscosity impression material
Areas of loose fit
Impression taken with a low viscosity impression material

Figure 1. The magnitude of the ear canal tissue stretching depends on the viscosity of the impression material. The use of a low viscosity material may result in an earmold that is loose, uncomfortable and feedsback.

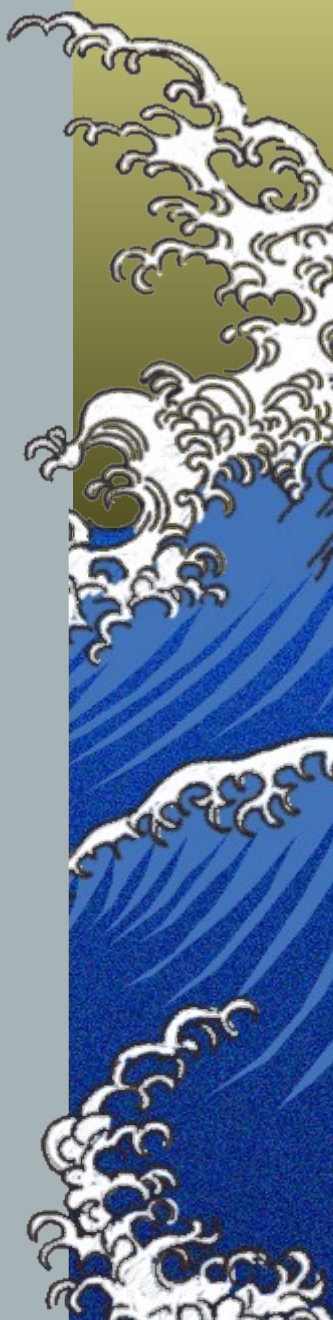
“In taking an ear impression, stretching the ear canal with hand-mixed silicone is most desirable. Such stretching will insure a secure and comfortable fit.”

- Chester Pirzanski, B.Sc., Process Engineer for Starkey Laboratories.

Quotes:

"What most determines the overall quality of the completed earmold is the initial accuracy of the ear impression, the viscosity of the impression material, and the specific care."

– Mark Ross, PhD. taken from his article at http://www.pa-shhh.org/ross/ross45.html

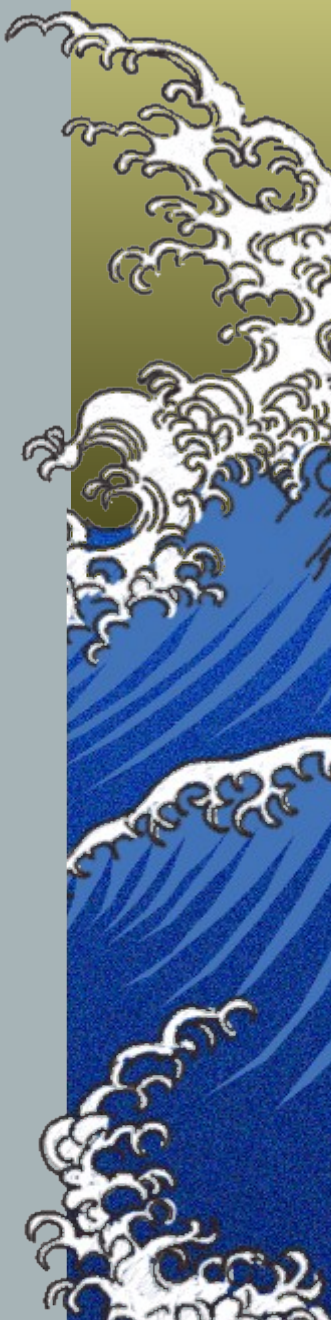


“Our new position? Open-jaw impressions taken with a Bite Block are favorable in the majority of fittings.”

– Westone Laboratories

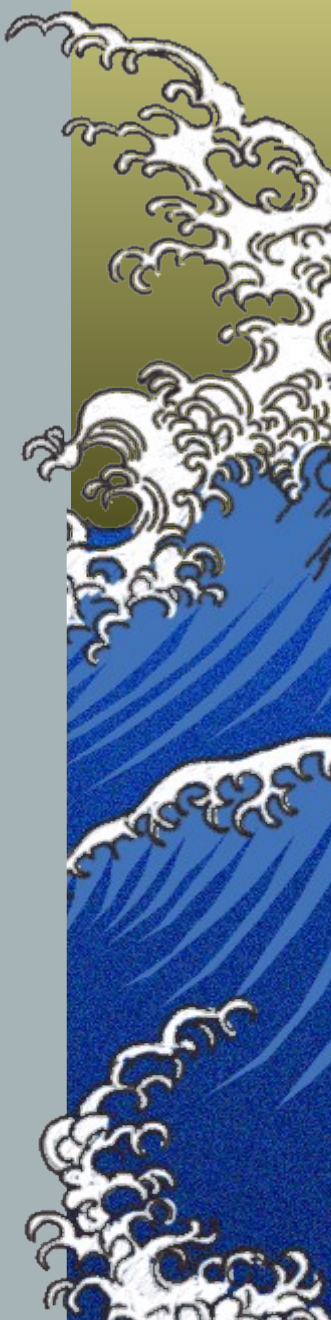
IV. Earmold impression depth

Earmold impressions should be taken past the second bend.



Why past the 2nd bend?

1. *To obtain proper seal. The seal of an earmold occurs between the 1st and 2nd bend. An earmold that does not seal will not prevent NIHL. Good retention is not the same thing as a good seal.*
2. *To avoid discomfort from a loose earmold*
3. *To avoid discomfort from a tip that otherwise might be pointed into the canal wall.*
4. *To minimize the occlusion effect.*



VI. Future Concerns

1. *Agreement on Navy wide protocol for taking earmold impressions.*

2. *Training protocol for AVT, hospital corpsmen, and civilian HCP technicians.*

3. *Determining who receives custom hearing protection and when earmold impressions are obtained.*

V. Conclusion

When taking an earmold impression use an open-jaw technique with a high viscosity material past the second bend.

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